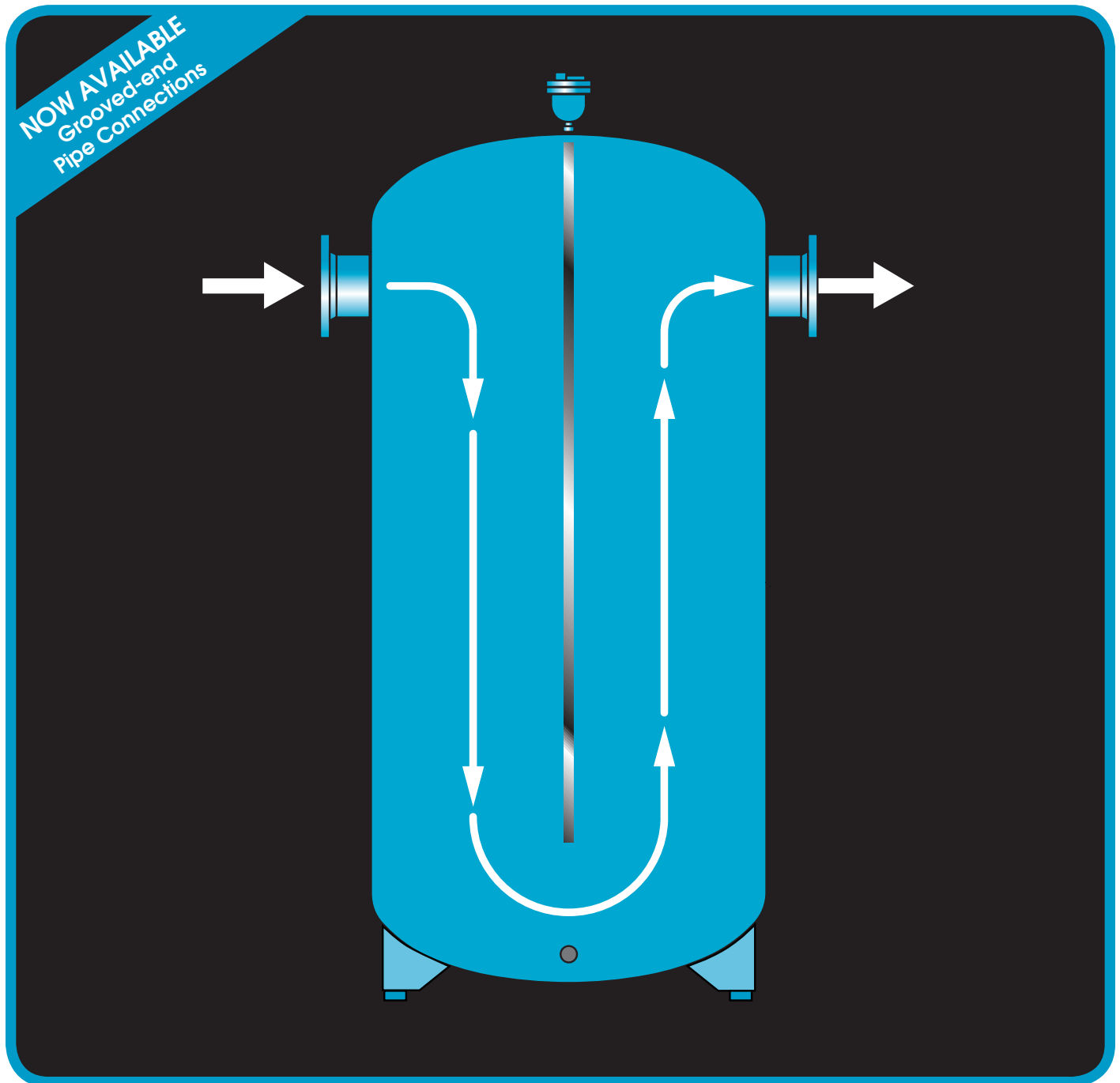


Chilled Water Buffer Tanks



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Selecting a Chilled Water Buffer Tank

Cemline Chilled Water Buffer Tanks (CWB) are designed to be used with chillers which do not have water volumes of sufficient size in relation to the chiller. The insufficiently sized systems do not have enough buffer capacity for the chilled water causing poor temperature control, erratic system operation, and excessive compressor cycling. The CWB solves this problem by adding volume to buffer the system. The CWB reduces the rate of change of the return water temperature.

Chillers are designed to be used in systems with a minimum water volume. The minimum water volume is based upon the chiller manufacturer requirements, typically 3 to 6 gallons per ton for typical air conditioning applications or 6 to 10 gallons per ton when temperature accuracy is critical. When chiller systems are

properly sized, the chiller compressor will not short cycle. Without the proper amount of system water, the source temperature will be reached quickly and the compressor will shut off. Many chiller compressors can only start 3 times per hour. If the compressor is off and there is a demand for chilled water, the demand can not be met

because the compressor cannot turn back on. This causes very unsatisfied people within the building who cannot have the required cooling. Insufficiently sized system problems can cause excessive compressor cycling, poor temperature control and erratic system operations.

Standard Equipment

- Tank - ASME (125 psi @ 400° F)
- 1/2" flexible, elastomeric thermal insulation black in color (Thicknesses of 3/4", 1", 1 1/2", 2" available)
- Legs for vertical installation
- Internal Baffle
- Air Vent

Available Options

- Seismic zone 4 angle legs (4 qty)
- Outdoor exterior coating. White in color and weather resistant to UV and ozone.
- Outdoor stucco-embossed aluminum jacket (0.016" thick, 26 GA)

CWB Sizing

Chiller manufacturers recommend the system volume should be between 3 to 6 gallons per ton of nominal cooling for typical air conditioning applications. When temperature accuracy is critical, they recommend 6 to 10 gallons per ton of nominal cooling.

Step 1

Calculate the system volume required by the manufacturer. Please check with the manufacturer specific recommendations for gallons per ton of nominal cooling required and use in the below equation.

$$\text{Required system volume (RSV)} = \text{Chiller tons} \times \text{Recommended system volume/ton}$$

Step 2

Calculate the existing water volume of the system. The system includes piping and terminal equipment. The table below shows how many gallons per foot are in schedule 40 steel pipe. Add to the pipe volume to the volume of the terminal equipment.

$$\text{Actual system volume (ASV)} = \text{piping volume (PV)} + \text{terminal equipment volume (TEV)}$$

Pipe Size Schedule 40 Steel Pipe	Gallons Per Foot
1	0.04
1.5	0.1
2	0.17
2.5	0.25
3	0.38
4	0.66
5	1.04
6	1.5

Pipe Size Schedule 40 Steel Pipe	Gallons Per Foot
8	2.59
10	4.09
12	5.82
14	7.02
16	9.18
18	11.67
20	14.45

Step 3

Calculate the tank size required. Buffer tank size required is calculated by subtracting the actual system volume from the required system volume.

Tank size required (TSR) = Required system volume (RSV) - Actual system volume (ASV)

The table at right shows the tank volume sizes available to select.

Tank Volume	120	200	300	500	680	850	1040
Diameter	24"	30"	36"	42"	48"	54"	60"
Length	60"	72"	72"	90"	96"	96"	96"

Chilled water tanks can be supplied with inlet/outlet openings selected from the chart at right.

Openings 'F'
1" NPT
1.5" NPT
2" NPT or Grooved-end Pipe
2.5" NPT or Grooved-end Pipe
3" FLANGE or Grooved-end Pipe
4" FLANGE or Grooved-end Pipe
6" FLANGE or Grooved-end Pipe
8" FLANGE or Grooved-end Pipe
10" FLANGE or Grooved-end Pipe
12" FLANGE or Grooved-end Pipe
14" FLANGE or Grooved-end Pipe
16" FLANGE or Grooved-end Pipe
18" FLANGE or Grooved-end Pipe
20" FLANGE or Grooved-end Pipe

Cemline CWB's are now available with grooved-end pipe.

Grooved-end Pipe
 • 6" and below Schedule 40 pipe
 • 8" and above Schedule 30 pipe

Step 4

Select insulation thickness based upon tank temperature and maximum ambient temperature + humidity.

Tank Temperature	Max. Ambient Temperature	Max. Ambient Humidity	Recommended Insulation Thickness
50 °F	85 °F	70% RH	1/2"
35 °F	85 °F	70% RH	3/4"
0 °F	85 °F	70% RH	1 1/2"
50 °F	90 °F	80% RH	1"
35 °F	90 °F	80% RH	1 1/2"
0 °F	90 °F	80% RH	2"

Example



A building has a 100 Ton Chiller with a flow rate of 240 g.p.m. through 300 feet of 4" pipe. The unit to be located indoors with a tank temperature of 45 °F unit to have standard leg stands.

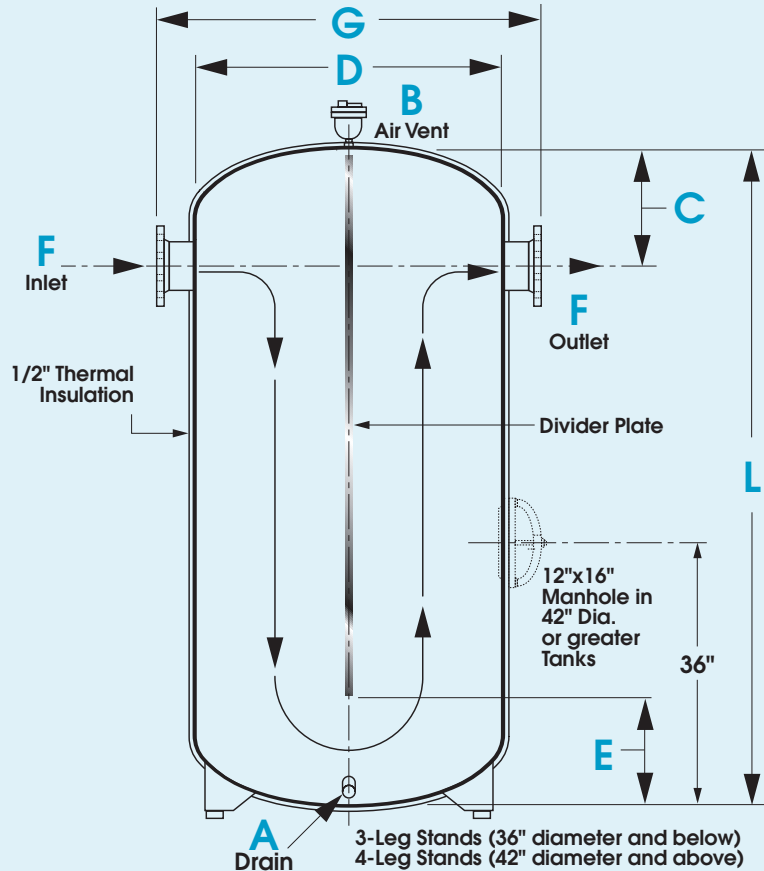
- 1. Required system volume** = (chiller tons) x (recommended system volume/ton)
 $100 \text{ ton} \times 5 \text{ gallons/ton} = 500 \text{ gallon volume required}$
- 2. Actual system volume** = (piping volume) + (terminal equipment volume)
 Piping volume: $300 \text{ ft} \times 0.66 \text{ gallons/ft} = 198 \text{ gallon}$
 Terminal equipment = 35 gallon
 Actual system volume = $198 + 35 = 233 \text{ gallon}$
- 3. Tank size required** = (required system volume) - (actual system volume)
 $500 \text{ gallon} - 233 \text{ gallon} = 267 \text{ gallon}$
- 4. Insulation required** = 1/2"

Therefore, choose a V300CWB with 4" flanges or grooved-end pipe with 1/2" thick insulation Model No. V300CWB4F-C-05-I

Chilled Water Buffer Tanks - Submittal Drawing



Openings 'F'
1" NPT
1.5" NPT
2" NPT or Grooved-end Pipe
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14" FLANGE or Grooved-end Pipe
16" FLANGE or Grooved-end Pipe
18" FLANGE or Grooved-end Pipe
20" FLANGE or Grooved-end Pipe



Tank Volume	Diameter "D"	Length "L"	Drain "A"	Vent "B"	Distance of Center of Opening "C"	"E"	"G"
120	24"	60"	1"	3/4"	12"	20"	34"
200	30"	72"	1"	3/4"	14"	24"	40"
300	36"	72"	1"	3/4"	16"	24"	46"
500	42"	90"	1 1/2"	3/4"	18"	30"	52"
680	48"	96"	1 1/2"	3/4"	20"	32"	58"
850	54"	96"	1 1/2"	3/4"	22"	32"	64"
1040	60"	96"	1 1/2"	3/4"	24"	32"	70"

*G dimension for Flanged and Grooved-end pipe only.



Model Number Code

V _____ CWB _____

GALLON CAPACITY

OPENING SIZE

OPENING TYPE

F = Flange
N = NPT
G = Groove End Pipe

SUPPORT

C = Leg Stands
SL = Siesmic Legs

INSULATION THICKNESS

None = 0
1/2" = 05
3/4" = 075
1" = 10
1 1/2" = 15
2" = 20

LOCATION

I = Indoor
O = Outdoor Coating
A = Stucco Embossed Aluminum Jacket
N = No Insulation

